



## EFFECTS OF INTERVAL CONTINUOUS AND ALTERNATE PACE RUNNING ON CARDIO RESPIRATORY ENDURANCE

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**Abstract:** The purpose of the study was to find out the effects of interval continuous and alternate pace running on cardio respiratory endurance. To achieve this purpose, sixty men students in the department of physical Education and sports sciences, Annamalai university, Tamilnadu, India were selected as subjects at random. The selected subjects were divided into four equal groups of fifteen subjects each, such as interval running group, continuous running group, alternate pace running group and control group. The group I underwent interval training programme, Group II underwent continuous running programme and group III underwent alternate pace running for three days per week for twelve weeks. Group IV acted as control group which did not participate any special training programmes apart from their regular physical education activities as per their curriculum. The age groups of the subjects were ranged from 18 to 24 years. Cardio respiratory endurance was selected as criterion variable and measured through Cooper's 12 minutes run and walk test. All the subjects of four groups were tested on selected criterion variables at prior to and immediately training programme. The analysis of covariance revealed a significant adjusted post test mean ( $F = 113.63$ ,  $p < 0.05$ ). It is concluded that cardio respiratory fitness improved better in continuous method than interval and alternate pace method.

**Keywords:** Interval training, continuous running, alternate pace running, cardio respiratory endurance, ANCOVA, physical education students.

## INTRODUCTION

Evolution of human life starts in the movement. Human beings are very active and creative by nature and physical activity is the part of their life all among since evolution for primitive man, scared for food and shelter was the first activity. This first physical activity was the first mode of communication and also a means of



expression. Human beings are evolved culturally, emotionally and socially including physical activity. The benefits of an active lifestyle are well documented [1-3]. Many of these benefits are also associated with higher levels of cardio respiratory fitness ( $\text{VO}_2\text{max}$ ) which may exert protective effects that are independent of traditional risk factors [3,4]. Additionally, for individuals with low physical fitness, even modest improvements in fitness can have substantial health benefits. However, some individuals may have a limited ability to increase their cardio respiratory fitness (trainability) in response to endurance exercise training [5,6].

Previously untrained individuals who undertake a sustained programme of endurance type exercises show improvements in maximal oxygen uptake sometimes in excess of 20 percent. The post-training data from a 4-month training programme conducted by Ekblom and his colleagues (1968) [7] show a mean 17 per cent rise in maximal oxygen uptake, from  $3.12$  to  $3:68 \text{ L} \cdot \text{min}^{-1}$ . Increased cardiac output –  $22.4$  to  $24:2 \text{ L} \cdot \text{min}^{-1}$  accounts for half of that improvement, entirely due to increased stroke volume; improved peripheral extraction is responsible for the remaining 50 percent. Endurance training involves manipulation of intensity, duration, and frequency of training sessions. The relative impact of short, high-intensity training versus longer, slower distance training has been studied and debated for decades among athletes, coaches, and scientists. The purpose of the study was to find out the effects of interval continuous and alternate pace running on cardio respiratory endurance.

## **Methods**

### ***Subjects***

Sixty men students in the Department of Physical Education and Sports Sciences, Annamalai University, Tamilnadu, India. The selected subjects were divided into four equal groups of fifteen subjects each, such as interval running group, continuous running group, alternate pace running group and control group. The group I underwent interval training programme, Group II underwent continuous running programme and group III underwent alternate pace running for three days per week for twelve weeks. Group IV acted as control group which did not participate any special training programmes apart from their regular physical education activities as per their curriculum. The age groups of the subjects were ranged from 18 to 24 years.



### ***Variables and test***

The selected subjects were tested on selected criterion variable namely cardio respiratory endurance which was tested by Cooper's 12 Minutes Run/Walk Test. The students cardio respiratory fitness was assessed before and after 12 weeks of training.

### ***Cooper's 12 Minutes Run/Walk Test***

In this test, a 400 meters track was prepared with marking at every tenth meter which easily measures the distance covered. The investigator and with few testers who served as the lap scores. The subjects were asked to stand on the starting line drawn at the finish line of the 400 meters track and they were given instruction to cover as much as distance possible by running/walking. They were instructed to continue the run/walk till the final whistle. The race was started with a whistle and at the end of the 12<sup>th</sup> minute. The whistle was blown. The number of minutes left was announced to the subjects every minute. At the 12th minute a whistle was blown and the subjects stopped instantly and stood on the spot. The distance covered by each subjects were recorded with help of the lap scorer.

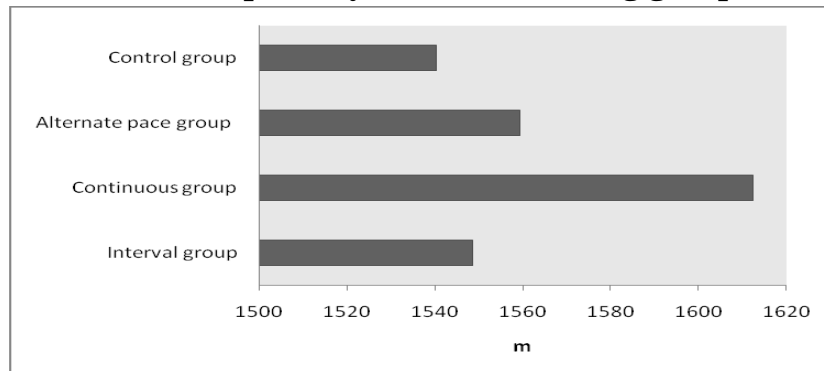
### ***Statistical technique***

The analysis of covariance( ANCOVA) was used to analysis the significant differences among the groups, The 'F' ratio was found to be significant for adjusted post mean, the Scheffé's post hoc test was applied to determine which of the paired means difference was significant.

### **RESULTS**

The adjusted post-test means on cardio respiratory endurance of interval training group, continuous running group, alternate pace running group and control group are 1548.65, 1612.47, 1559.45 and 1540.44 respectively. The obtained 'F' ratio of 113.63 for adjusted post-test means is greater than the table value of 2.78 for df 3 and 55 required for significance at .05 level of confidence on cardio respiratory endurance. The result of the study indicated that there was significant difference the adjusted post-test means of interval training group, continuous running group, alternate pace running group and control group on cardio respiratory endurance. After adjusting the pre test effect on post adjusted mean values are presented in Figure 1.

**Figure 1**  
**Cardio respiratory endurance among groups**



## DISCUSSION

The result of this study showed that there was a significant difference between interval training group and continuous running group, interval running group and alternate pace running group, interval training and control group. Continuous running group and alternate pace running group, Continuous running group control group, alternate pace running group control group on cardio respiratory endurance. Moxnes & Hausken (2012) [8] used different endurance training methods and elicited that  $VO_2$  max is improved with all training methods. The subjects were assigned to one of the groups according to their physical education class periods but they has to be trained based on the game which they play.

## CONCLUSION

It is concluded that cardio respiratory fitness improved better in continuous method than interval and alternate pace method but all the training groups showed significant improvement in cardio respiratory fitness.



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